FACT SHEET
March 2012

INFORMATION

Introduction:
Obesity is a major health concern worldwide. Today 65% of the world's population live in countries where overweight and obesity are responsible for more deaths than underweight (World Health Organisation, WHO). The increase in obese individuals and, in particular, children has reached epidemic proportions and threatens the sustainability of public health care systems. In developed nations up to 10% of health care costs are spent on treating obesity related disorders.
The European Union (EU) and the WHO have initiated specific programmes to tackle this urgent health and societal problem. While obesity is preventable, the rapid increase is not sufficiently explained by changes in personal life style and nutrition. Therefore the concept of early programming of obesity risk through nutrition before and during pregnancy, and in early childhood, has received widespread attention by researchers. Insights into the trans-generational programming of obesity and associated diseases, such as the effects of maternal dietary and lifestyle choices on the obesity risk of her child, offer new avenues for prevention and the promotion of health and well-being.

Through a global strategy to curb the obesity epidemic, the research project EarlyNutrition focuses on investigating the physiological mechanisms which provide the basis for early nutritional programming of health. A systematic approach will study factors during pregnancy and early childhood that affect the risk of obesity and related disorders in later life. This will lead to novel evidence-based advice for reducing obesity and improving health of people in Europe and worldwide. EarlyNutrition therefore aims to provide a strengthened scientific basis for practical recommendations and guidelines for policy decisions.

About obesity:
According to the WHO, overweight and obesity are among the five leading causes of deaths globally. Rates of obesity and especially of childhood obesity have rapidly increased all over the world during the past two decades, and continue to do so in many countries. In 2010, about 43 million children under five were overweight. Overweight is associated with severe health problems and early death due to diabetes, hypertension, cardiovascular diseases and many other non communicable diseases. The associated health care costs for obesity related diseases adds to the urgency of finding ways to reverse this alarming trend. Evidence, particularly from the recent European Commission funded Early Nutrition Programming Project (EARNEST) coordinated by Prof. Koletzko and his team, confirmed that nutritional imbalances have a long lasting programming effect on later health and risk of disease. Based on this evidence the coordinating team at the University of Munich and their project partners have initiated the project EarlyNutrition.

EARLYNUTRITION PROJECT

Title:
Long-term effects of early nutrition on later health

Project No.:
FP7-289346-EarlyNutrition

Total budget:
EURO 11,12 Mio

EU Contribution:
EURO 8,96 Mio

Coordinator:
Ludwig-Maximilians-University Munich, Germany
Professor Berthold Koletzko, MD PhD (Dr med Dr med habil)

Project Manager: Brigitte Brands, MBE, PhD (Dr hum biol)

Start:
February 1, 2012

Duration:
60 months

Contact:
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Website:
www.project-earlynutrition.eu
OBJECTIVES OF EARLYNUTRITION:

The research programme of EarlyNutrition is focused on the contemporary key hypotheses of early nutrition programming with an emphasis on coherence between four different scientific themes, to ensure strong added value from integrated multidisciplinary collaboration. The relevant themes investigate the relative roles of placental function, early growth patterns, pre-pregnancy weight status, pregnancy weight gain, overweight and obesity, gestational diabetes, infant feeding, genetic variation, environment, gender, lifestyle, physical activity, ethnicity and geographic background as determinants of the risk of obesity and associated disorders in the offspring. Experimental protocols in animals complement the human intervention studies by exploring in greater detail the mechanistic pathways of the same interventions tested in the human trials. Obesity predisposes to many other diseases. Focussing on childhood obesity as an endpoint has the practical advantage that it occurs over a shorter timeframe and allows improved understanding of the sequence of events in the development of the disease.

To achieve their objectives, researchers will conduct animal studies, observational studies in large concurrent populations, and randomized controlled human intervention trials, to obtain evidence for the mechanisms of early nutrition, effects and effect sizes acting on the origins of obesity, including these questions:

- What are the physiological mechanisms of early programming that increase long-term adiposity risk?
- Which dietary components can be identified that have a relevant effect?
- Can sensitive periods for early programming be identified during development?
- Are there specific metabolic or epigenetic markers that reflect early programming of later adiposity?

The project’s impact comprises definitive evidence on early nutrition effects on health to enhance EU and global policies. In addition, EarlyNutrition could boost economic benefits related to obesity prevention and to value-added dietary products. The strengthened scientific basis will provide an improved evidence base for policy decisions and for practical recommendations on optimal nutrition in key target groups.

THE CONSORTIUM

The project comprises the diverse but complementary skills of more than 50 scientists from 36 research institutions in Europe, the USA and Australia, coordinated by the Hauner Children’s Hospital, University of Munich. Based on experience gained in the predecessor project EARNEST, the present consortium builds a strong collaborative platform which now includes engagement with research teams from centres of excellence across the world. EarlyNutrition brings together a multidisciplinary team of internationally acknowledged scientists, carefully selected to be leaders in complementary areas key to advance the early programming field. Scientists conducting research at the forefront of mechanistic animal studies and in placental biology contribute their expertise. Participants include those who are leading some of the best characterised cohorts of pre-pregnant, and pregnant women and their children, and high quality randomized intervention trials in pregnancy and in infants. Researchers from the USA and Australia collaborate, share their experience, and expand the project’s impact into the global arena. The consortium also draws strongly on the expertise of members within the Early Nutrition Academy (ENA, www.early-nutrition.org), a sustainable entity arising from previous EC projects in this area.
Their *EarlyNutrition* themes, aims and objectives:
The project includes 6 themes addressing early programming of adiposity in a comprehensive fashion:

- Mechanistic studies on early nutrition programming
- Prospective observational studies on early nutrition programming in humans
- Randomized controlled intervention trials in pregnancy and in early childhood
- Development of the scientific basis for recommendations addressing health professionals and consumers
- Management of data and biosamples
- Project management, strategic integration, training and dissemination

**OBESITY- DEFINITION**

The definition of obesity is based on an excessive amount of extra body fat (adiposity) with adverse health consequences. Statistically, a high body mass index is associated with an increased adiposity. The BMI is calculated by a person's weight in kilograms divided by the square of his height in meters (kg/m²). WHO categorizes BMI values as follows:

<table>
<thead>
<tr>
<th>Category</th>
<th>BMI Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Underweight</td>
<td>&lt;18.5 kg/m²</td>
</tr>
<tr>
<td>Normal Weight</td>
<td>18.5 - &lt;25 kg/m²</td>
</tr>
<tr>
<td>Overweight</td>
<td>25- &lt;30 kg/m²</td>
</tr>
<tr>
<td>Obesity class I</td>
<td>30 - &lt;35 kg/m²</td>
</tr>
<tr>
<td>Obesity class II</td>
<td>35 - &lt;40 kg/m²</td>
</tr>
<tr>
<td>Obesity class III</td>
<td>≥35 kg/m²</td>
</tr>
</tbody>
</table>

**QUOTES**

Prof. Berthold Koletzko, Project Co-ordinator, Munich, Germany: “Nutrition during pregnancy and infancy has a marked programming effect in life-long health and can modify the risk of obesity and related diseases. Better understanding of the underlying mechanisms will help us to fully utilize the enormous preventive potential.”

Prof. Lucilla Poston, London, UK: “EarlyNutrition is an important opportunity to find out exactly how diet and lifestyle in pregnancy can influence the risk of obesity in the child. Once understood, this has the potential to make a significant contribution to improving the health of the next generation.”

Prof. Pat Catalano, Cleveland, Ohio: “EarlyNutrition is an excellent opportunity to determine the role of glucose intolerance during pregnancy, which affects as many as 1 in 5 pregnant women. The information learned from the EarlyNutrition consortium will lead to improved understanding and thus prevention of complications from this increasingly common condition.”

Prof. Elvira Larque, Murcia, Spain: “Better knowledge on the mechanisms involved in the placental transfer of fatty acids in obese pregnant women are essential to decide the best strategies to reduce lipid disturbances in the fetus during pregnancy, and later on in the offspring.”

Dr. Sonja Entringer, Irvine, California: “Maternal stress during pregnancy may produce a long-term impact on child development and health, including increased risk for obesity and metabolic dysfunction. EarlyNutrition will provide the first comprehensive evidence in humans on whether stress during pregnancy, by itself or by changing maternal diet/nutrition, influences the child’s risk of obesity.”
Prof. Piotr Socha, Warsaw, Poland: “The diet of infants and young children modulates metabolism and hormones, which is an experience that can be remembered life long. Early diet can be an important teacher for our biochemical machinery.”

Prof. Richard Saffery, Melbourne, Australia: “Long term health is dependent on the interaction between our genes and early life environment. At the intersection of genes and environment lies epigenetics, a complex repertoire of environmentally sensitive factors that control how our genes behave throughout our life. The EarlyNutrition project will incorporate epigenetic profiling as a key platform technology to help unravel the relationship between early life influences and later poor metabolic health.”

Prof. Keith Godfrey, Southampton, UK: “Susceptibility to obesity cannot simply be attributed to the combination of our genes and our lifestyle, but can be triggered by influences on a baby’s development in the womb, including the mother’s nutrition before and during pregnancy. EarlyNutrition will provide important new evidence to prevent childhood obesity by improving a mother’s nutrition and her baby’s development in the womb.”

EARLYNUTRITION PARTNERS

EUROPE:
Austria:
Biolution GmbH
Medical University of Graz

Belgium:
University Libre de Bruxelles

Denmark:
Statens Serum Institute
University of Copenhagen

Germany:
Beneo GmbH

Greece:
National and Kapodistrian University of Athens

Ireland:
University College Cork, National University of Ireland, Cork
University College Dublin, National University of Ireland, Dublin

Italy:
University Degli Studi di Milano

Norway:
Norwegian Institute of Public Health

Poland:
Medical University of Warsaw
The Children’s Memorial Health Institute

Spain:
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University of Granada
University of Murcia
University Rovira I Virgili

The Netherlands:
Danone Research BV
Erasmus University Medical Center
Leiden University Medical Center
Nizo Food Research BV
ServiceXS BV
University Amsterdam

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The Chancellor, Masters and Scholars of the University of Cambridge
University of Nottingham
University of Southampton

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Harvard Pilgrim Health Care Inc Corp, MA
The Regents of the University of California, CA
The University of Texas System, Texas

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Telethon Institute for Child Health Research, University of Western Australia
The University of Adelaide